

O.M. Raznatovska<sup>1</sup>, V.I. Petrenko<sup>2</sup><sup>1</sup> Zaporizhzhia State Medical University, Zaporizhzhia, Ukraine<sup>2</sup> Bogomolets National Medical University, Kyiv, Ukraine

## Peculiarities of pulmonary rehabilitation in patients with chronic respiratory diseases in palliative and hospice care (review)

Pulmonary rehabilitation is an interdisciplinary program of care for patients with chronic respiratory disorders, created individually and aimed at physical and social indicators and autonomy optimizing. Physical therapists in an interdisciplinary palliative care team are key to the success of pulmonary rehabilitation for palliative patients, focusing on the physical functioning.

Objective — to review the data from literature references regarding the characteristics and usage frequency of pulmonary rehabilitation for patients with respiratory diseases who require palliative and hospice care, and to specify respiratory diseases in palliative care patients for which pulmonary rehabilitation is currently used.

As a result of the literature review, it was established that pulmonary rehabilitation in patients with chronic respiratory diseases who require palliative and hospice care is aimed at improving pulmonary symptoms (shortness of breaths) and functional status, reducing the intensity of accompanying symptoms, even in the late stages of the disease, which ultimately contributes improving the quality of life and survival of patients, reducing the burden on those who care for them. But access to physical (pulmonary) rehabilitation for patients with chronic respiratory diseases who need palliative and hospice care, is currently not routine in practice and not used enough around the world, unfortunately. It was found that today pulmonary rehabilitation in palliative patients is used only for chronic obstructive pulmonary diseases, interstitial lung diseases, cystic fibrosis, sarcoidosis, idiopathic pulmonary fibrosis and bronchiectasis. At the same time, the literature does not describe the use of physical therapy methods, including pulmonary rehabilitation, in patients with bronchial asthma who require palliative treatment.

Pulmonary rehabilitation in patients with chronic respiratory diseases who require palliative and hospice care is a relevant and effective method of treatment, but needs wider implementation in the modern health care system.

### Keywords

Pulmonary rehabilitation, respiratory diseases, palliative care, hospice care.

Palliative care is a team approach of comprehensive care to meet the needs (physical, psychological, social and existential) of patients and their families. Palliative care patients suffer from chronic functional impairments that require rehabilitation techniques and physical therapy [30]. Rehabilitation, even in the late stages of a disease, allows palliative patients to maintain mobility and autonomy, reduce the intensity of associated symptoms, con-

tributing to both an improvement of patient's quality of life and a reduction of caregiver burdens. Physical therapy methods improve physical autonomy and help manage symptoms to prevent subsequent complications of diseases [3].

Rehabilitation at home is a rehabilitation model aimed at helping people with disabilities integrate into society and become as autonomous as possible [16]. But there are some challenges hampering devel-

opment of the rehabilitation at home direction that could affect the quality of services – these are problems of availability, lack of state support (programs and resources), low awareness and misconceptions about such services for patients and their families.

The main methods of rehabilitation are physical therapy and ergotherapy (occupational therapy). Physical therapists in an interdisciplinary palliative care team are key to the success of rehabilitation for palliative patients [10], focusing on the physical functioning (providing comfort and support).

The problems most commonly experienced by palliative care and hospice patients, requiring rehabilitation interventions, are low quality of life, depression, respiratory and cardiovascular disorders, greater needs for care, and utilization of health care services. Rehabilitation measures for comprehensive end-of-life care for patients improve their functional state and quality of life, reducing the manifestations of numerous symptoms [17].

Pulmonary rehabilitation is an interdisciplinary program of care for patients with chronic respiratory disorders, which is individually tailored and designed to optimize physical and social indicators and autonomy. Basic components of pulmonary rehabilitation: exercise (upper limb endurance training, lower limb endurance training, strength and respiratory muscle training), learning (breathing strategies, energy saving and work simplification, end-of-life instruction), psychosocial and behavioral intervention (survival strategies, stress coping), evaluation of results [20].

Therefore, the relevance of this work lies in the analysis of data from literature sources regarding the characteristics of pulmonary rehabilitation for patients with chronic respiratory diseases at the stage of palliative and hospice care.

The objective of the work is to review the data from literature references regarding the characteristics and usage frequency of pulmonary rehabilitation for patients with respiratory diseases who require palliative and hospice care, and to specify respiratory diseases in palliative care patients for which pulmonary rehabilitation is currently used.

One of the principal components in managing patients with chronic respiratory diseases is pulmonary rehabilitation [32, 33], which is highly effective in most individuals. Pulmonary rehabilitation is aimed at improving the patient's pulmonary symptoms and functional state, which as a result contributes to improving the quality of life [11]. A primary role in pulmonary rehabilitation is played by a physical therapist, whose responsibilities include identifying patients who need pulmonary rehabilitation; evaluation of each patient before engagement in the program; active involvement in exercise and

training programs [9]. A.L. Reticker et al. [28] note that important components in the complex treatment of patients with chronic respiratory diseases, including chronic obstructive pulmonary disease (COPD), are pulmonary rehabilitation and palliative care, which should be implemented as a part of high-quality medical care. At the same time, hospice care (the last stage of palliative care), which also includes pulmonary rehabilitation, may be provided to patients with COPD when a treatment goal for them is changed from life-sustaining therapy to comfortable therapy [14].

Studying the effects of pulmonary rehabilitation on patients with chronic respiratory diseases receiving palliative care, J.R. McCormick [21] has found its effect on symptom relief among this contingent of patients, increased home activity in some patients, and improvements in the quality of life.

H.Y. Neo et al. [23] examined the impact of 6-month palliative rehabilitation (functional rehabilitation with early palliative care) on medical care and functioning of frail older adults with chronic lung diseases, among which COPD (89 %), interstitial lung disease (54 %) and bronchiectasis (28 %) were most commonly identified. The authors estimated the number of hospital readmissions, length of hospital stay, number of emergency department visits, 6-minute walking distance and Modified Barthel Index (MBI). Based on the obtained data, it has been revealed that functional rehabilitation with early palliative care allowed to reduce the length of hospital stay and improve functional capabilities in frail older people with chronic lung diseases (indicators of 6-minute walking distance and MBI).

L.J. Brighton et al. [5] studied the role of supportive and palliative care for people with chronic respiratory diseases and frailty, which was associated with an increased risk of unfavorable outcomes. The authors have found that rehabilitation interventions to reinforce reserves, advance care planning and early palliative care (integrated models of care including respiratory one) were very useful for frail people living with chronic respiratory diseases. Also, researchers pointed out that frail patients with COPD had a high potential to get the benefits of physical exercise, were highly motivated to complete pulmonary rehabilitation, but faced difficulties in performing it and often needed additional support and flexibility due to a variable and unpredictable health condition [6–8]. For optimizing the exercise benefits, it is essential to maintain trusting relationships between physical therapists, patients, and caregivers, create shared understanding of needs, and personalize approaches to demands and priorities. Therefore, first of all, the authors recommend

considering person-centered approaches to minimize a negative impact on health and support involvement and completion of pulmonary rehabilitation.

R.G. Duenk et al. [12] emphasize that identifying individuals in need of palliative care remains challenging, despite sufficient availability of effective palliative care interventions in the management of respiratory symptoms for patients with COPD. The initiation of palliative respiratory care should be based on the severity of patient's symptoms and unmet needs [31]. In the late stage of COPD, respiratory symptoms (shortness of breath, cough, fatigue) heavily influence the physical and psychological functioning of a person, accelerate the progression of chronic respiratory failure and reduce the quality of life, that results in disability [27].

In K. Vonbank et al. guidelines for outpatient pulmonary rehabilitation [33], the latter has been demonstrated to improve exercise tolerance and quality of life in patients with chronic lung diseases and reduce the number of hospital days as well as other indicators of health care utilization in patients with COPD.

The effect of pulmonary rehabilitation on dyspnea and the ability to perform functional loads in patients with COPD was also studied by S. Pancera et al. [25]. Patients undergoing a standard pulmonary rehabilitation program (5 sessions per week for 4 weeks) received 2 daily 30-minute sessions of aerobic exercise with additional continuous chest wall vibration during cycling and training with a load or breathing techniques. The authors have found that in COPD patients, continuous chest wall vibration with simultaneous aerobic training supplementary to the standard pulmonary rehabilitation program improved functional exercise tolerance, but did not affect dyspnea, respiratory muscle function, or quality of life.

Evaluating an interdisciplinary approach to the management of patients with progressive COPD at the palliative stage, A. Pyszora et al. [27] have shown positive effects of such methods of physical therapy as pulmonary rehabilitation, physical activity, neuromuscular electrical stimulation and methods for cleaning the respiratory tract.

A. Modlińska et al. [22] also point out that both quality of life and life expectancy are low in patients with COPD. The authors also focus on the fact that patients do not receive adequate palliative care even though COPD is a progressive disease with high mortality. Among the main symptoms of COPD progression, the authors distinguish shortness of breath, cough, fatigue, depression, emotional and psychosocial problems. But the first priority, according to the authors, should be given to the quality of life of COPD patients at the palliative stage.

Reviewing the most successful developments in pulmonary rehabilitation used in palliative care settings for dyspnea, S. Sachs and R.L. Weinberg [29] concluded that adequately tailored pulmonary rehabilitation could provide additional options to optimize functional capabilities and alleviate the symptom severity in patients with COPD. In this case, the authors highlighted the following most effective methods of pulmonary rehabilitation for dyspnea: aerobic exercises (reduce dyspnea and improve functional capacity), neuromuscular electrical stimulation (improves muscle strength, reduces dyspnea during physical exertion). It has also been identified that home self-monitored programs significantly differed from outpatient programs and had greater effectiveness.

Today, there is accumulating evidence in the literature for the experience of using pulmonary rehabilitation in patients with interstitial lung disease (ILD), which are characterized by a decrease in functional capacity, a progression of chronic respiratory failure, which is the cause of dyspnea and hypoxia, that finally results in disability, a decrease in the quality of life and survival [11, 13, 18, 19]. Meanwhile, M. Kreuter et al. [19] mention that palliative care experience is not available for both numerous ILD patients and their caregivers.

L. Dowman et al. [11] carried out a meta-analysis of the pulmonary rehabilitation impact on patients with ILD of various etiology, sarcoidosis, and idiopathic pulmonary fibrosis (IPF). Pulmonary rehabilitation was mainly performed in outpatient settings, and only a small number of patients received it at home, in hospitals or telerehabilitation settings. The length of pulmonary rehabilitation ranged from 3 to 48 weeks. Pulmonary rehabilitation has been found to improve the 6-minute walking distance, peak workload and peak oxygen uptake and decrease shortness of breath. When examining long-term outcomes, the authors noted that even 6–12 months after using pulmonary rehabilitation, patients had better exercise tolerance, less dyspnea, and a better quality of life compared to those who did not undergo pulmonary rehabilitation. At that, better results of pulmonary rehabilitation were observed in patients with IPF. Based on the study, the authors concluded that pulmonary rehabilitation was safe for ILD patients and had positive effects on exercise tolerance, symptoms, quality of life, and survival compared to no pulmonary rehabilitation in ILD individuals.

Studying the needs for specialized palliative care in end-stage progressive fibrotic ILD for both patients and caregivers, S. Bajwah et al. [1] have determined the following. Both patients and caregivers reported uncontrolled symptoms of dyspnea,

coughing, and insomnia that severely affected every sphere of life, limiting their ability to perform everyday activities. Based on this, the authors indicated the need to educate specialists about appropriate palliative care interventions to improve control over the symptoms.

P. Faverio et al. [13] reported necessarily assessment of the need for application of such 3 measures in the management of chronic respiratory failure in patients with ILD as pulmonary rehabilitation, referral to lung transplantation centers, and palliative care.

S. Bajwah et al. [2] indicate that patients with progressive ILD should receive the best palliative supportive therapy (opioids, oxygen, and neuro-modulators) to improve control over the symptoms and quality of life. A lot of emphasis is put on the examination of dyspnea. But at the same time, the work does not take into account the use of such physical therapy methods as pulmonary rehabilitation for patients.

J. Boland et al. [4] have assessed the need for palliative care in patients with «life-limiting, incurable, and nonmalignant lung disease» such as COPD, ILD, and cystic fibrosis. The authors have reported that patients with these moderate-to-severe diseases experienced pain, fatigue and dyspnea, indicating the particular importance of dyspnea as a cause of social isolation and difficulties performing daily activities, worsening quality of life and, in most cases, being incurable towards the end of life. Therefore, it was concluded that since an access to palliative care was limited for these patients, barriers to referral to specialists should be understood and reduced, that alongside effective work between palliative care teams and backup respiratory services would optimize the delivery of care to patients with COPD, ILD and cystic fibrosis.

According to G. Peryer et al. [26], supportive and palliative care is sorely needed to alleviate the burden of symptoms and reduce the risk of premature mortality in people with respiratory disease and a history of serious mental illness. The authors have suggested that for such a contingent, as part of palliative care, there should be an objective monitoring of concomitant chronic lung diseases and special attention to reducing the rate of respiratory infections.

C.R. Osadnik et al. [24] evaluated the effectiveness of pulmonary rehabilitation in patients with bronchial asthma in terms of physical capacity, asthma control, quality of life, frequency of severe exacerbations/hospitalization, mental health, muscle strength, and level of physical activity. Pulmonary rehabilitation included 3 to 4 weeks (inpatient) or 8 to 12 weeks (outpatient) of aerobic training

and learning or self-control. The training or self-management components included breathing retraining and relaxation, dietary recommendations, and psychological consultation. One of the programs was specially developed for people with severe bronchial asthma, and a separate group included patients with overlap syndrome (combined course of bronchial asthma and COPD). At the end of the study, the authors noted that pulmonary rehabilitation in patients with both bronchial asthma and overlap syndrome was associated with a clinically significant improvement in functional load capacity and quality of life.

An effectiveness of 6-month complex palliative and respiratory care in patients with progressive diseases (COPD, ILD, cancer) with refractory dyspnea was evaluated by I.J. Higginson et al. [15] according to the following indicators: relief of dyspnea, improvement of quality of life, survival. The breathlessness support service combined palliative care, respiratory medicine, physical therapy, and occupational therapy. Thus, relief of dyspnea and improvement of quality of life was noted in all patients with such care, but the survival rate was significantly higher in patients with COPD and ILD than that in cancer patients.

## Conclusions

Pulmonary rehabilitation for patients with chronic respiratory diseases who require palliative and hospice care, even in the late stages of the disease, is aimed at alleviating pulmonary symptoms (dyspnea) and improving functional status, reducing the intensity of associated symptoms and as a result, the quality of life and survival of patients are improved and caregiver burden is reduced. But, unfortunately, in practice, access to physical (pulmonary) rehabilitation for patients with chronic respiratory diseases who require palliative and hospice care is currently underused and not routine around the world. It has been demonstrated that contemporary pulmonary rehabilitation for palliative patients was used only for chronic obstructive pulmonary disease, interstitial lung disease, cystic fibrosis, sarcoidosis, idiopathic pulmonary fibrosis and bronchiectasis. The literature, however, has not covered the use of physical therapy methods, including pulmonary rehabilitation, for patients with bronchial asthma who require palliative treatment.

Thus, pulmonary rehabilitation for patients with chronic respiratory diseases who require palliative and hospice care is a relevant and effective method of treatment but needs wider implementation in the current health care system.



**There are no conflicts of interest.**

**Participation of authors:** concept and design of the study – O.M. Raznatovska, V.I. Petrenko; collection of material – O.M. Raznatovska; processing of the material – O.M. Raznatovska, V.I. Petrenko; writing the text and statistical data processing – O.M. Raznatovska; editing of the text – V.I. Petrenko.

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О.М. Разнатовська<sup>1</sup>, В.І. Петренко<sup>2</sup>

<sup>1</sup>Запорізький державний медичний університет, Запоріжжя

<sup>2</sup>Національний медичний університет імені О.О. Богомольця, Київ

## Особливості легеневої реабілітації у пацієнтів із хронічними респіраторними захворюваннями у межах паліативної та хоспісної допомоги (огляд літератури)

Легенева реабілітація — це міждисциплінарна програма догляду за пацієнтами з хронічними порушеннями дихання, що розробляється індивідуально та призначена для оптимізації фізичних та соціальних показників і автономії. Фізичні терапевти у міждисциплінарній команді паліативної допомоги відіграють ключову роль в успішній легеневій реабілітації паліативних пацієнтів, яка зосереджена на фізичному функціонуванні.

Мета роботи — провести огляд даних літературних джерел щодо особливостей та частоти застосування легеневої реабілітації у пацієнтів з респіраторними захворюваннями, які потребують паліативної та хоспісної допомоги, а також визначити, при яких саме респіраторних захворюваннях у паліативних хворих на сьогодні використовується легенева реабілітація.

Аналіз літературних джерел виявив, що легенева реабілітація у пацієнтів з хронічними респіраторними захворюваннями, які потребують паліативної та хоспісної допомоги, навіть на пізніх стадіях хвороби спрямована на поліпшення легневих симптомів (задухи) і функціонального стану, зменшення інтенсивності супутніх симптомів, що сприяє підвищенню якості життя та виживання пацієнтів, а також зниженню навантаження на осіб, які здійснюють за ними догляд. Однак на практиці доступ до фізичної (легеневої) реабілітації у пацієнтів із хронічними респіраторними захворюваннями, які потребують паліативної та хоспісної допомоги, в усьому світі не є рутинним і використовується недостатньо. Установлено, що нині легенева реабілітація у паліативних пацієнтів застосовується лише при хронічних обструктивних та інтерстиціальних захворюваннях легень, муковісцидозі, саркоїдозі, ідіопатичному легеневому фіброзі та бронхоектатичній хворобі. У літературі не описано використання методів фізичної терапії, зокрема легеневої реабілітації, у хворих з бронхіальною астмою, які потребують паліативного лікування.

Легенева реабілітація у пацієнтів із хронічними респіраторними захворюваннями, які потребують паліативної та хоспісної допомоги, є актуальним та ефективним методом лікування, але потребує ширшого впровадження в сучасну систему охорони здоров'я.

**Ключові слова:** легенева реабілітація, респіраторні захворювання, паліативна допомога, хоспісна допомога.

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### Контактна інформація:

Разнатовська Олена Миколаївна, д. мед. н., проф., зав. кафедри фізіатрії і пульмонології  
<https://orcid.org/0000-0003-2252-9063>  
69035, м. Запоріжжя, просп. Маяковського, 26  
E-mail: [raznatovskaya@gmail.com](mailto:raznatovskaya@gmail.com)

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